

AMENDMENTS TO THE CLAIMS

Claim 1 (Currently Amended) A decoding device, comprising:

a decoding unit operable to decode an encoded image signal~~which is obtained by~~
encoding image frames~~which form~~of an image signal[[,]] and by encoding additional
information for creating an interpolation frame~~which interpolates~~for interpolating the image
frames based on a first motion vector that~~which~~ is a motion vector between the image frames, so
as to output decoded image frames of the image signal and decoded additional information;

a motion vector detection unit operable to detect a second motion vector, which is a
motion vector between (i) the image frames of the encoded image signal~~which are decoded~~
based on the decoded additional information output from the decoding unit and (ii) the decoded
image frames output from the decoding unit; and

an interpolation frame creation unit operable to create an interpolation frame, considering
the detected second motion vector as the first motion vector, such that the created interpolation
frame is created based on the second motion vector, the decoded image frames output from the
decoding unit~~which are decoded~~, and the decoded additional information output from the
decoding unit~~which is decoded~~,

wherein the interpolation frame creation unit obtains an interpolation motion vector based
on a ratio between a distance in terms of time between the decoded image frames and a distance
in terms of time to an interpolation position of the interpolation frame for interpolating the image
frames based on the first motion vector, and creates the interpolation frame based on the
interpolation motion vector and the decoded image frames,

wherein the additional information includes (i) an interpolation method for the interpolation frame with respect to the image frames, (ii) a motion detection method for detecting the first motion vector, and (iii) profile information specifying a combination of information, and wherein the additional information further includes at least one of (i) residual information of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.

Claim 2 (Cancelled)

Claim 3 (Cancelled)

Claim 4 (Currently Amended) AThe decoding device according to claim 1~~-claim 2~~,
wherein:

the motion detection method is included in the additional information as code information for specifying a combination of parameters of motion detection; and

the motion vector detection unit detects the second motion vector based on the parameters of the motion detection specified by the code information.

Claim 5 (Currently Amended) AThe decoding device according to claim 1~~-claim 2~~,
wherein, when the motion detection method included in the additional information cannot be performed, the motion vector detection unit detects the second motion vector using a

predetermined motion detection method determined in accordance with the motion detection method included in the additional information.

Claim 6 (Currently Amended) AThe decoding device according to claim 1-claim 2, wherein the additional information is information produced for every interpolation frame.

Claim 7 (Currently Amended) AThe decoding device according to claim 1-claim 2, wherein the motion detection method included in the additional information is information produced for every stream of the encoded image signal.

Claim 8 (Currently Amended) AThe decoding device according to claim 1, wherein, when the additional information is not included in the encoded image signal, the interpolation frame creation unit creates the interpolation frame based on the decoded image frames ~~which are decoded~~.

Claim 9 (Currently Amended) An encoding device, comprising:

a first motion vector detection unit operable to detect a first motion vector, which is a motion vector between image frames of-forming an image signal;

an additional information production unit operable to produce additional information for creating an interpolation frame from the image frames and creating a motion vector for the interpolation frame, the motion vector being derived from the first motion vector based on a ratio between a distance in terms of time between the image frames and a distance in terms of time to

an interpolation position of the interpolation frame, which interpolates the image frames based on the first motion vector and the image frames; and

an encoding unit operable to encode the image frames and the additional information,
wherein the additional information includes (i) an interpolation method for the interpolation frame with respect to the image frames, (ii) a motion detection method for detecting the first motion vector, and (iii) profile information specifying a combination of information, and
wherein the additional information further includes at least one of (i) residual information of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.

Claim 10 (Cancelled)

Claim 11 (Cancelled)

Claim 12 (Currently Amended) ~~A#~~The encoding device according to claim 9~~-claim 10~~, wherein the motion detection method is included in the additional information as code information for specifying a combination of parameters of motion detection.

Claim 13 (Currently Amended) ~~A#~~The encoding device according to claim 9~~-claim 10~~, wherein the additional information is information produced for every interpolation frame.

Claim 14 (Currently Amended) ~~A~~The encoding device according to claim 9~~-claim 10~~, wherein the motion detection method is included in the additional information as header information of a stream of the image signal.

Claim 15 (Currently Amended) ~~A~~The encoding device according to claim 9~~-claim 11~~, wherein the profile information is included in the additional information as header information of a stream of the image signal.

Claim 16 (Currently Amended) ~~A~~The encoding device according to claim 9, wherein, when a residual between ~~an~~ the interpolation frame created based on the image frames and the image signal corresponding to the interpolation frame is small, the encoding unit does not encode the additional information.

Claim 17 (Currently Amended) An interpolation frame creating system for creating an interpolation frame ~~which interpolates~~ for interpolating image frames ~~forming of~~ an image signal, the interpolation frame creating system comprising:

a first motion vector detection unit operable to detect a first motion vector, which is a motion vector between the image frames of the image signal;

an additional information production unit operable to produce additional information for creating the interpolation frame from the image frames and creating a motion vector for the interpolation frame, the motion vector being derived from the first motion vector based on a ratio between a distance in terms of time between the image frames and a distance in terms of time to

an interpolation position of the interpolation frame, based on the first motion vector and the image frames;

an encoding unit operable to encode the image frames and the additional information;

a decoding unit operable to decode the encoded image frames and the encoded additional information ~~which are encoded~~, so as to output decoded image frames of the image signal and decoded additional information;

a second motion vector detection unit operable to detect a second motion vector, which is a motion vector between (i) the image frames of the encoded image signal ~~which are decoded~~ based on the decoded additional information and (ii) the decoded image frames output from the decoding unit; and

an interpolation frame creation unit operable to create an interpolation frame, considering the detected second motion vector as the first motion vector, such that the created interpolation frame is created based on the second motion vector, the decoded image frames output from the decoding unit ~~which are decoded~~, and the decoded additional information output from the decoding unit ~~which is decoded~~;

wherein the interpolation frame creation unit obtains an interpolation motion vector based on a ratio between a distance in terms of time between the decoded image frames and a distance in terms of time to an interpolation position of the interpolation frame for interpolating the image frames based on the first motion vector, and creates the interpolation frame based on the interpolation motion vector and the decoded image frames,

wherein the additional information includes (i) an interpolation method for the interpolation frame with respect to the image frames, (ii) a motion detection method for detecting the first motion vector, and (iii) profile information specifying a combination of information, and

wherein the additional information further includes at least one of (i) residual information of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.

Claim 18 (Currently Amended) An integrated circuit device, comprising:

a decoding section operable to decode~~for decoding~~ an encoded image signal ~~which is~~ obtained by encoding image frames ~~which form~~ of an image signal~~[[,]]~~ and by encoding additional information for creating an interpolation frame ~~which interpolates~~ for interpolating the image frames based on a first motion vector ~~that~~~~which~~ is a motion vector between the image frames, so as to output decoded image frames of the image signal and decoded additional information;

a motion vector detection section operable to detect~~for detecting~~ a second motion vector, which is a motion vector between (i) the image frames of the encoded image signal~~which are~~ decoded based on the decoded additional information output from the decoding section and (ii) the decoded image frames output from the decoding section; and

an interpolation frame creation section operable to create~~for creating~~ an interpolation frame, considering the detected second motion vector as the first motion vector, such that the created interpolation frame is created based on the second motion vector, the decoded image frames output from the decoding section~~which are decoded~~, and the decoded additional information output from the decoding section~~which is decoded~~,

wherein the interpolation frame creation section obtains an interpolation motion vector based on a ratio between a distance in terms of time between the decoded image frames and a distance in terms of time to an interpolation position of the interpolation frame for interpolating the image frames based on the first motion vector, and creates the interpolation frame based on the interpolation motion vector and the decoded image frames,

wherein the additional information includes (i) an interpolation method for the interpolation frame with respect to the image frames, (ii) a motion detection method for detecting the first motion vector, and (iii) profile information specifying a combination of information, and

wherein the additional information further includes at least one of (i) residual information of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.

Claim 19 (Currently Amended) An integrated circuit device, comprising:

a first motion vector detection section operable to detect~~for detecting~~ a first motion vector, which is a motion vector between image frames of forming~~forming~~ an image signal;

an additional information producing section operable to produce~~for producing~~ additional information for creating an interpolation frame from the image frames and creating a motion vector for the interpolation frame, the motion vector being derived from the first motion vector based on a ratio between a distance in terms of time between the image frames and a distance in terms of time to an interpolation position of the interpolation frame,~~which interpolates the image frames based on the first motion vector~~ and the image frames; and

an encoding section operable to encode ~~for encoding~~ the image frames and the additional information,

wherein the additional information includes (i) an interpolation method for the interpolation frame with respect to the image frames, (ii) a motion detection method for detecting the first motion vector, and (iii) profile information specifying a combination of information, and

wherein the additional information further includes at least one of (i) residual information of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.

Claim 20 (Currently Amended) A non-transitory computer-readable recording medium having a decoding program recorded thereon, the decoding program ~~for causing a computer to execute~~ perform a decoding method comprising ~~which comprises~~:

a decoding step ~~for~~ of decoding an encoded image signal ~~which is obtained by encoding image frames which form of an image signal[[,]] and by encoding additional information for creating an interpolation frame which interpolates~~ for interpolating the image frames based on a first motion vector that ~~which~~ is a motion vector between the image frames, so as to output decoded image frames of the image signal and decoded additional information;

a motion vector detection step ~~of~~ for detecting a second motion vector, which is a motion vector between (i) the image frames of the encoded image signal which are decoded based on the decoded additional information output from the decoding step and (ii) the decoded image frames output from the decoding step; and

an interpolation frame creation step ~~of~~ for creating an interpolation frame, considering the detected second motion vector as the first motion vector, such that the created interpolation frame is created based on the second motion vector, the decoded image frames which are decoded output from the decoding step, and the decoded additional information output from the decoding step which is decoded,

wherein the interpolation frame creation step obtains an interpolation motion vector based on a ratio between a distance in terms of time between the decoded image frames and a distance in terms of time to an interpolation position of the interpolation frame for interpolating the image frames based on the first motion vector, and creates the interpolation frame based on the interpolation motion vector and the decoded image frames,

wherein the additional information includes (i) an interpolation method for the interpolation frame with respect to the image frames, (ii) a motion detection method for detecting the first motion vector, and (iii) profile information specifying a combination of information, and

wherein the additional information further includes at least one of (i) residual information of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.

Claim 21 (Currently Amended) ~~A~~A non-transitory computer-readable recording medium having an encoding program recorded thereon, the encoding program ~~for~~ causing a computer to execute ~~perform~~ an encoding method comprising which comprises:

a first motion vector detection step ~~of for~~ detecting a first motion vector, which is a motion vector between image frames ~~of forming~~ an image signal;

an additional information production step ~~of for~~ producing additional information for creating an interpolation frame from the image frames and creating a motion vector for the interpolation frame, the motion vector being derived from the first motion vector based on a ratio between a distance in terms of time between the image frames and a distance in terms of time to an interpolation position of the interpolation frame, ~~which interpolates the image frames based on the first motion vector~~ and the image frames; and

an encoding step ~~of for~~ encoding the image frames and the additional information, wherein the additional information includes (i) an interpolation method for the interpolation frame with respect to the image frames, (ii) a motion detection method for detecting the first motion vector, and (iii) profile information specifying a combination of information, and wherein the additional information further includes at least one of (i) residual information of the interpolation frame and an image frame corresponding to the interpolation frame, and (ii) a vector difference between a motion vector of the interpolation frame detected with respect to the image frames and a motion vector of the interpolation frame derived based on the first motion vector with respect to the image frames.